

REMARKS/ARGUMENTS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 23-53 are presently active in this case.

The outstanding Office Action rejected Claims 23-38 and 45-53 under 35 U.S.C. § 103(a) as unpatentable over Brongersma (U.S. Patent No. 7,088,449) in view of Lee et al. (U.S. Patent Publication No. 2004/0038307). Claims 39-42 and 44 were rejected under 35 U.S.C. § 103(a) as unpatentable over Brongersma in view of Lee et al. further in view of Chee et al. (U.S. Patent No. 7,226,734). Claim 43 was rejected under 35 U.S.C. § 103(a) as unpatentable over Brongersma in view of Lee et al. further in view of Pohl (U.S. Patent No. 5,461,600).

In response to the rejection of the claims under 35 U.S.C. §103(a), Applicant respectfully requests reconsideration of these rejections and traverses the rejections, as discussed next.

Briefly recapitulating, Applicant's invention, as recited in independent Claim 23, relates to a surface plasmon microsensor or nanosensor for chemical or biological species. The claimed device includes pads distributed on the surface of a support, the pads including at least one electrically conductive material and configured to immobilize the chemical or biological species, the pads having a dimension less than 1 μm .

Turning now to the applied prior art, Brongersma discloses a method and a system for measuring a dimensional parameter of a structure having a metal constituency and a corresponding plasmon-based metal constituency characteristic. Brongersma uses a plasmon-exciting light. Fig. 3 and the corresponding text (col. 6, lines 36-67) describes the application of the method of the measurement of nanoparticles.

Brongersma does not relate to a surface plasmon microsensor or nanosensor for chemical or biological species, having pads distributed on the surface of a support, the pads having a dimension less than 1 μm .

The Office Action combines the teachings from Lee (page 21, paragraph 192) and from Brongersma. This passage of Lee concerns a surface-relief volume diffractive (SRVD) biosensor. In this paragraph, Lee suggests to use a surface relief pattern that resembles a stepped pyramid, each inverted pyramid being approximately about 0.5 to about 5 microns in diameter.

Applicant respectfully submits that it would not have been obvious to one of ordinary skill in the art of biosensors to combine the teachings of Brongersma (measuring a dimensional parameter using a plasmon-exciting light) to the teachings of Lee. Absent improper hindsight reconstruction, there is no apparent reason to arrive at such a combination.

Further, dependent Claim 31 requires that the pads be formed by superposition of a metallic layer integral with the support and an ultra thin layer of a material enabling attachment of the chemical or biological species. In rejecting Claim 31, the Office Action cites Lee (page 12, paragraph 119). This paragraph, however, does not disclose nor suggest the possibility to use a metallic layer covered by a thin layer enabling attachment of chemical or biological species in an SPR type detecting device.

Dependent Claim 34 requires that the means for increasing the sensitivity of the sensor includes a thin metallic film deposited on the surface of the support. The Office Action points to paragraph 191 of Lee. This paragraph, however, concerns an SRVD type biological sensor, which is different from a SPR type sensor. This paragraph does not disclose nor suggest the use of a thin metallic film deposited on the surface of the support of a surface plasmon sensor.

Dependent Claim 35 requires that a thin dielectric film be intercalated between the thin metallic film and the pads to adjust plasmon resonance as a function of thickness of the dielectric layer. In rejecting Claim 35, the Office Action points again to paragraph 191 of Lee, which has no relation with the detection by surface plasmon resonance. Moreover, this paragraph does not disclose nor suggest the deposition of a thin dielectric film intercalated between a thin metallic film and the pads, the resonance frequency of the surface plasmon being dependent on the thickness of the thin dielectric film.

Dependent Claim 36 requires that the means for increasing the sensitivity of the sensor include a planer wave guide configured to convey a guided electromagnetic mode, the planar wave guide being formed on the surface or under the surface of the support and under the pads. In rejecting Claim 36, the Office Action points to paragraph 201 of Lee. This paragraph relates to an SPR type detection. This paragraph, however, does not disclose nor suggest the use of a planar waveguide to increase the sensitivity.

Dependent Claim 37 requires that the means for increasing the sensitivity of the sensor is constituted by grouping together of pads, a distance separating the grouped together pads being sufficiently small to allow an electromagnetic coupling between the grouped together pads. Paragraph 201 of Lee, however, does not disclose nor suggest bringing closer the pads to induce an electromagnetic coupling allowing an increase of sensitivity.

Dependent Claim 38 requires that the pads have a section in a form of an ellipse, and the means for increasing the sensitivity of the sensor be constituted by a small distance separating an end of a pad along the major axis of the ellipse from the end of the adjacent pad along the major axis of the ellipse, this small distance enabling an electromagnetic coupling between the pads. In rejecting Claim 38, the Office Action refers to Fig. 3 of Brongersma. However, this figure does not disclose nor suggest the above features of Claim 38.

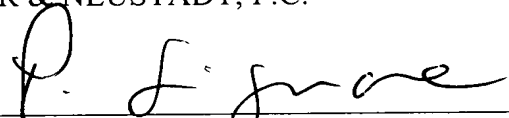
As to claims 39-42 and 44, the Office Action points to the teachings of Brongersma, Lee and Chee. However, Chee does not disclose the detection of chemical species by surface plasmon. A person of ordinary skill in the art wishing to increase the sensitivity of a chemical or biological species sensor using surface plasmons would not consider Chee.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 23-53 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the below listed telephone number.

Respectfully submitted,

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